
Concrete Thinking
for a sustainable world
PCA
Portland Cement Association
2009 Fall TTCC/NCC
Cement Standards of the Future
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125 mL
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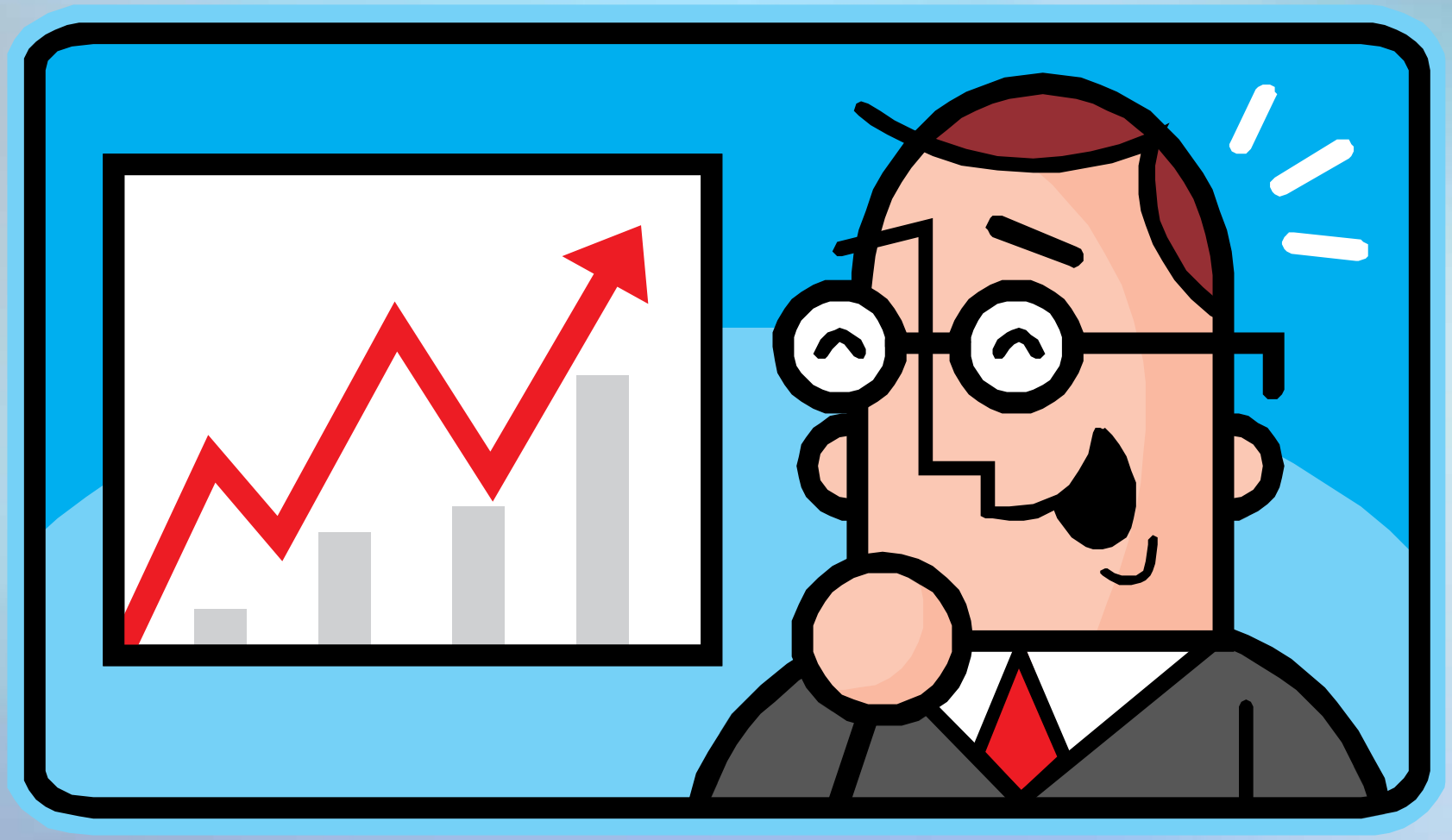
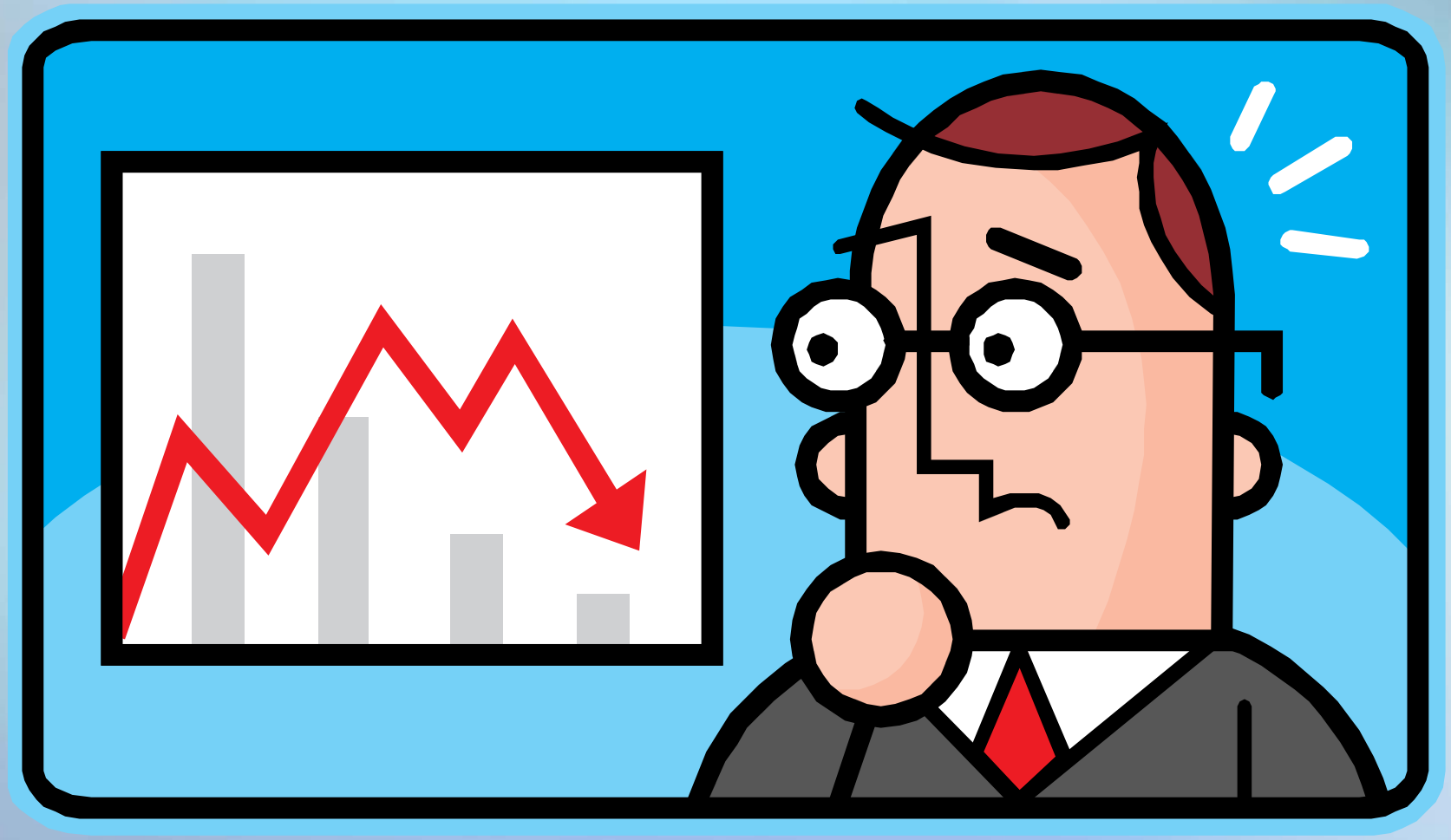
Mystical Approach

Historical Approach



Historical Approach



Wise Council Approach

We should all be concerned about the future because we will have to spend the rest of our lives there. ~Charles F. Kettering

I never think of the future - it comes soon enough. ~Albert Einstein

Analytical Approach

- Will cement standards of the future be different from those of today, if so how?
  - Cement standards change through consensus processes – do we (users of the standards) believe there is a need for them to change?
    - Examine what we need from cement standards
    - Review past changes and current status
    - Consider key issues that are or are likely to create the need for future changes

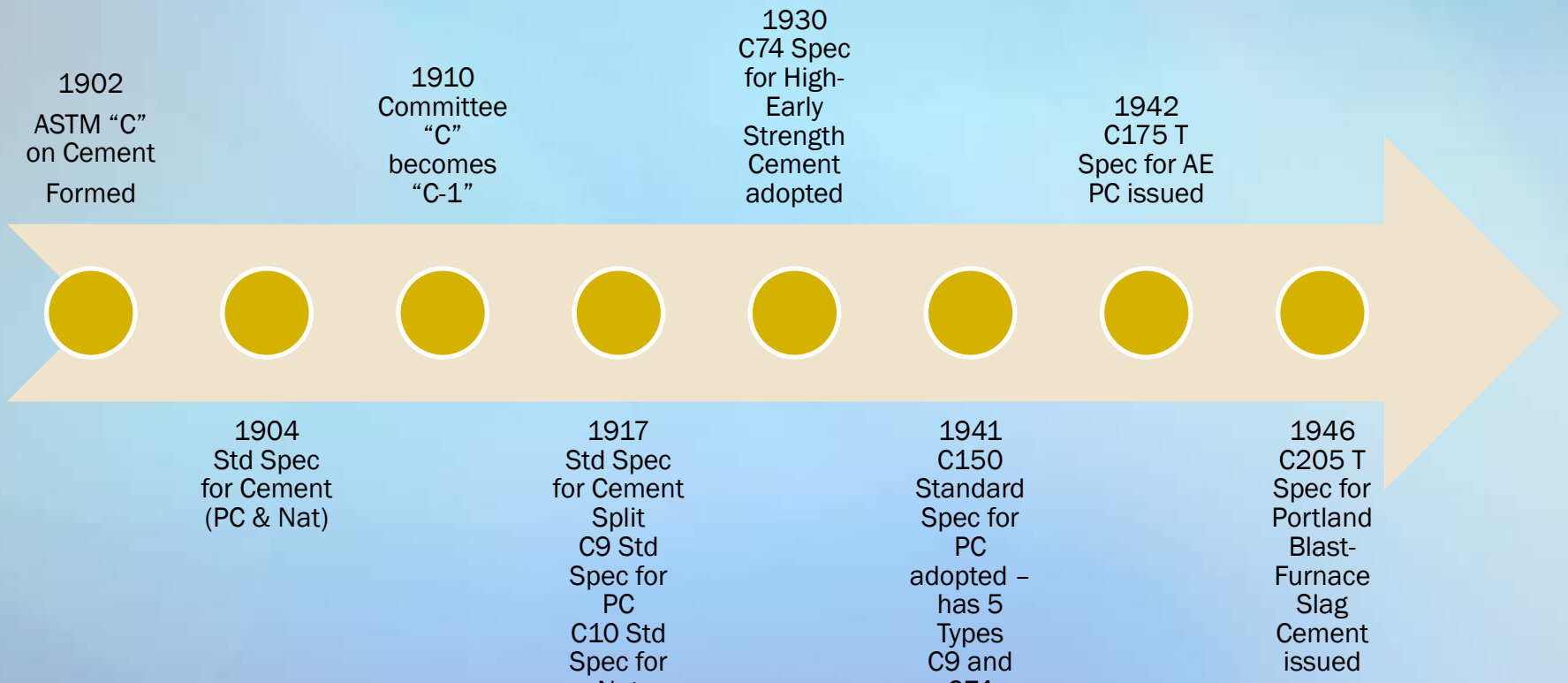
Cement Standards – What we need

- Basic function - Define key information between a buyer and seller to facilitate commerce
  - To have an impact, standards must be accepted and used
  - Standards generally define key information using prescriptive criteria, performance criteria, or a combination of the two

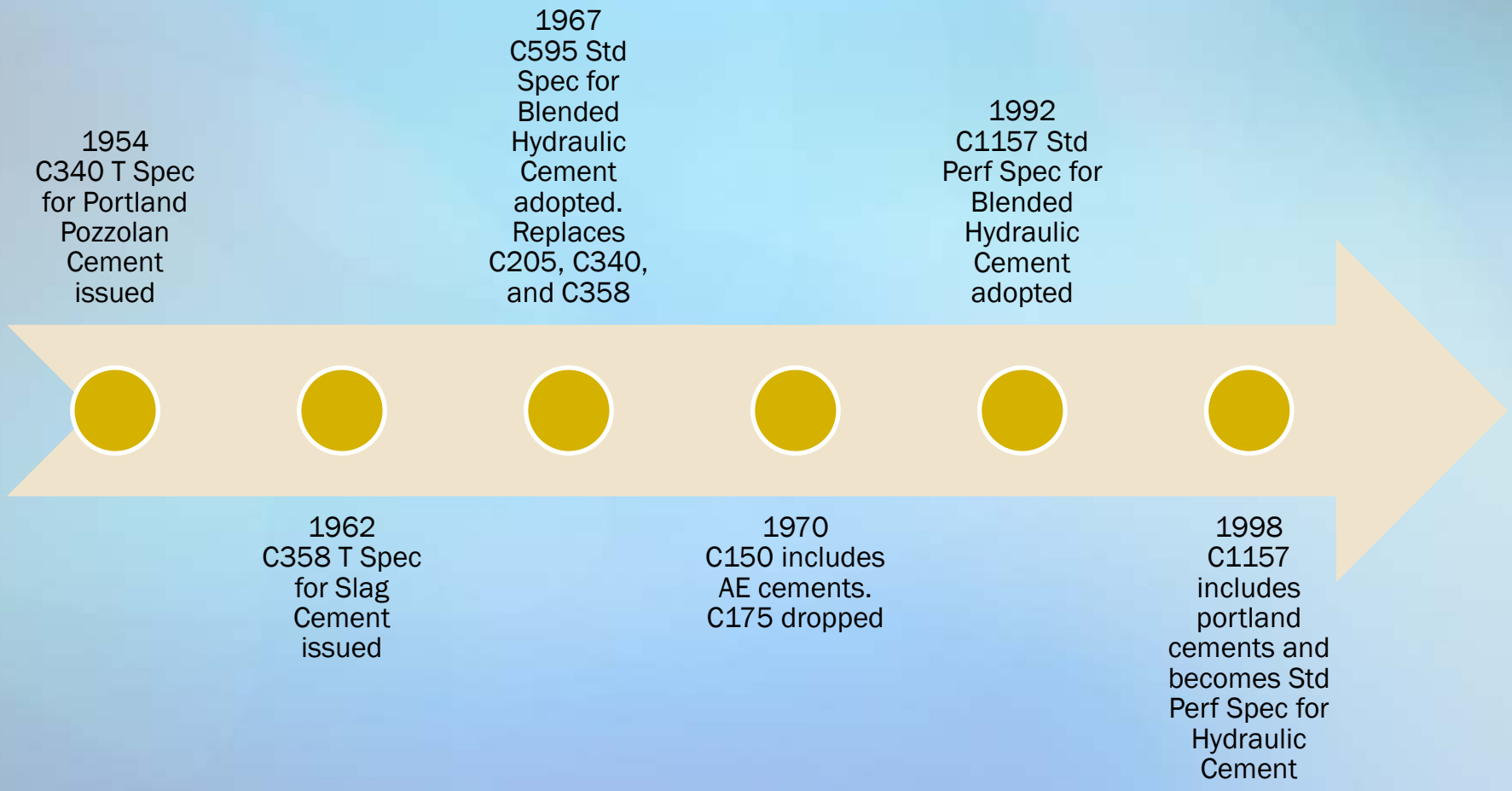
Cement Standards – What we need

- Ensure concrete performance
  - Focus on end use and user
  - Identify key performance attributes
  - Recognize that concrete is more than cement
- Unambiguous acceptance criteria
  - Use clear and mandatory language
  - Use simple and reliable test methods
- Permit optimization of natural resources and manufacturing technology

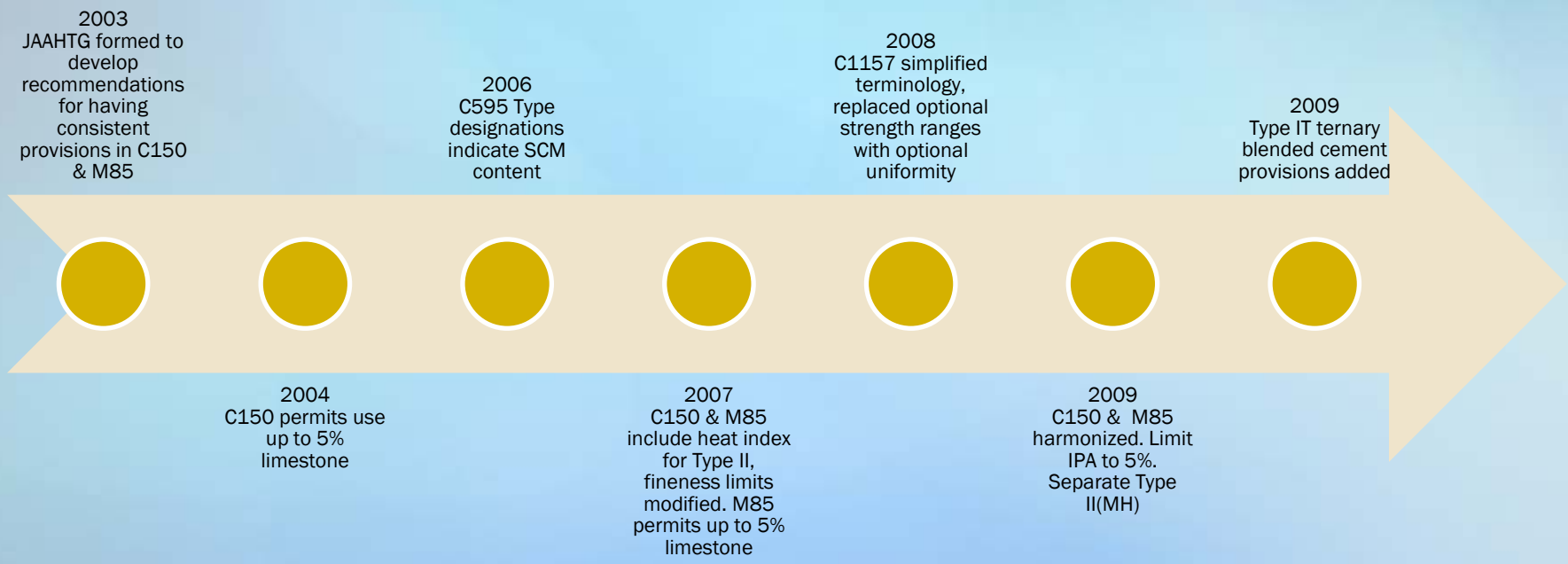
Cement Standards – First 50 Yrs.



Cement Standards – Second 50 Yrs.



Cement Standards – 2000 to Present



Cement Standards – Current Status

- ASTM C150/AASHTO M85 – Portland Cement
  - Widely used and accepted
  - Has prescriptive and performance criteria
  - Prescriptive provisions limit optimization of natural resources and manufacturing technology
  - Active issues being considered
    - New business items from recent balloting process
    - New method for measuring heat of hydration
    - Alternate approaches to addressing Bogue calculations

Cement Standards – Current Status

- ASTM C595/AASHTO M240 – Blended Cement
  - Widely referenced, but limited use
  - Has prescriptive and performance criteria
  - Prescriptive criteria provides options for use of SCMs
  - Active issues being considered
    - New business from recent ballot to establish designation for ternary blended cements

Cement Standards – Current Status

- ASTM C1157 – Performance Specification for Hydraulic Cement
  - Referenced in most codes and standards, but not often used by DOTs
  - No AASHTO Counterpart
  - “Pure” performance approach offers greatest flexibility for optimizing resources and technology
  - No active work items for additional changes

Cement Standards – Performance

"Concrete is more than Cement"

- C150, C595, & C1157 address virtually the same cement related concrete performance issues
  - Fresh properties – setting time, false set, heat of hydration
  - Hardened properties – strength, strength gain
  - Durability – soundness, internal sulfate, external sulfate, ASR
- Prescriptive and performance criteria are both intended to ensure or assure concrete performance

Key Issue(s) Driving Change

WHAT CHANGES WILL WE MAKE TO OUR CEMENT STANDARDS?

Cement Standards Development Principles

- Performance includes consideration of sustainable development
- Strength and durability are key components of concrete's sustainability
- Look at what we need in addition to what we have – search for alternate solutions
- Engage producers, users, and general interest representatives in process

Cement Standards – Discussion/Questions

- Cement Standards Development Options to Support Concrete Sustainable Development Goals
  - Modifications to existing prescriptive standards
  - Increased use of performance specifications
  - New cement standards
  - Combination of existing standards

Thank you!